



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,709	02/05/2004	Jianbai Zhu	TI-36284	5626
23494	7590	10/05/2005	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED			CAO, PHAT X	
P O BOX 655474, M/S 3999			ART UNIT	
DALLAS, TX 75265			PAPER NUMBER	
			2814	

DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

EX

Office Action Summary	Application No. 10/772,709	Applicant(s) ZHU ET AL.	
	Examiner Phat X. Cao	Art Unit 2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 July 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 16-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's election of Group I (claims 1-15) in the reply filed on 7/18/05 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 112

2. Regarding claim 5, line 2, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1-2, 4-11 and 14-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Heo (US. 6,555,917).

Regarding claims 1, 8 and 10, Heo (Fig. 8B) discloses a semiconductor device comprising: a plurality of semiconductor chips 10 having an active and an inactive surface 11a/11b in a vertical stack; the chips 10 including at least two flip-chip pairs 10-1 and 10-2 having their active surfaces 11a bonded face-to-face; a substrate 12 having a plurality of bond pads 18 and interconnection circuitry 22, and a plurality of wire bond connections 30 between the chips and the substrate 12.

Regarding claims 2, 4, and 6, Heo (Fig. 8B) further discloses that the flip-chip pairs 10-1/10-2 comprising a base chip 10-1 with the active surface 11a facing upward and having exposed bond pads 16 connected to bond pads 18 on the substrate 12, a chip 10-2 with the active surface 11a facing downward, and a plurality of flip-chip solder bumps 34 interconnecting the active surfaces 11a.

Regarding claims 5 and 9, Heo (Fig. 8B) further discloses that the plurality of semiconductor chips 10 coupled with the substrate 12 comprises a functional electronic system including a memory circuit and a logic circuit (column 3, lines 8-10).

Regarding claims 7 and 11, Heo (Fig. 8B) further discloses that the interconnection by flip-bonds includes an anisotropic conductive material (column 5, lines 24-26), and the connections between the chips 10 and the substrate 12 comprise wire bonds or TAB bonds (column 1, lines 20-22).

Regarding claims 14 and 15, Heo (Fig. 8B) also discloses that the area between conductive bonds includes an underfill material 36, and the substrate 12 is a BGA package substrate (column 3, lines 13-15).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heo (US. 6,555,917) in view of Derderian (US. 2005/0067684).

Heo (Fig. 8B) further discloses that the inactive surfaces 11b of the chips 10 are adhered to the substrate 12 or to the inactive surface 11b of a successive chip pair by an adhesive 36.

Heo does not disclose that the adhesive 36 is a polymeric adhesive.

However, Derderian (Fig. 5) teaches a chip stack module having a chip pair 30 adhered to each other or to the substrate 20 by a polymeric adhesive 35 (par. [0052]). Accordingly, it would have been obvious to form the adhesive 36 of Heo with a polymeric adhesive because the polymeric adhesive has sufficient viscosity and surface tension to resist excessive spreading or flowing off of the chip active surface, as taught by Derderian (par. [0052]).

7. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heo in view of Goller et al (US. 2003/0042590).

Heo does not disclose rerouting of conductors on the active surface of one of the chips.

However, Goller (Fig. 4) teaches the flip-chip bonds interconnecting the chip pairs including rerouting of conductors 7/12 on the active surface of the chips 1/2. Accordingly, it would have been obvious to modify the chip stack module of Heo by rerouting of conductors on the active surface of one of the chips because such rerouting of conductors would provide the electrical connection paths between the solder contact areas, as taught by Goller (par. [0037]).

8. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Heo (US. 6,555,917) in view of Jacklin (US. 6,396,472).

Heo does not disclose that the semiconductor chips 10 include a video chip, an audio chip, a controller, chip and flash memory chips.

However, Jacklin (Fig. 7) teaches a semiconductor device system comprising a video chip 111, an audio chip 115, a controller chip 109 (CPU), and flash memory chips 113 (column 11, lines 8-11). Accordingly, it would have been obvious to form the semiconductor chips stack of Heo including a video chip, audio chip, a controller chip, and flash memory chips in order to provide a desired electronic device system used for the display of digital photographs and for the presentation of accompanying audio recordings, as taught by Jacklin (column 1, lines 5-10).

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phat X. Cao whose telephone number is 571-272-1703. The examiner can normally be reached on M-F.

Art Unit: 2814

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PC
September 29, 2005



PHAT X. CAO
PRIMARY EXAMINER